

Teaching science by creating toys from trash

Award-winning educator and toy maker Arvind Gupta has been taking science to children in every nook and cranny of the country using toys made from trash for nearly 40 years now. In an interview with us, the 63-year-old who is visiting the city speaks about his tryst with toy making, his observations of the Indian education system, and more.



Indian toy inventor Arvind Gupta demonstrates a scientific theory using his models
Chennai:

Growing up in a humble family in Bareilly, Uttar Pradesh, Arvind Gupta would make his own toys using paper, old matchboxes and cigarette packs, something that was common during his time. “My mother was very supportive. I would play for long hours, and she would let me be without ever reminding me to do homework or prepare for exams the next day.

Once, a rich relative gifted me a Mecanno Set (that consists of reusable metal strips, plates and high quality plastic parts that are connected using nuts, bolts and set screws). There was an instruction booklet with it which showed only a very limited number of models. However, I made many more models on my own.

Much later in 1978, when I was 25 years old, I designed the Matchstick Model Mecanno which in a sense was rooted in my childhood experience,” recalls Gupta. It was this drive to innovate that urged this IIT Kanpur graduate who also briefly worked with Tata Motors in Pune, to get into science popularisation. The real transition happened in the late 1970’s when he interned with the Hoshangabad (Madhya Pradesh) Science Teaching Program (HSTP) which attempted to make science fun for children using simple things found easily.

Since then, he has travelled with a cloth bag with two boxes full of toys made from trash and given demonstrations in over 3,000 schools and 25 countries. “The children are excited and each child goes back, picks up a broomstick, a piece of paper, a matchbox and makes his or her own toy,” adds Gupta. Giving us an example of how complicated concepts or theories can be easily explained through toys, he says, “Take the example of the ‘Straw Sprinkler’ – made from a plastic straw and a broomstick.

As you rotate it in a glass of water – water is sprinkled all over the ground. Children learn a great deal without being taught and this toy is a classic example of learning about centrifugal force. As the child spins the toy, water sprinkles and gives the child an intuitive feel for the phenomenon.” The toys also cost very little money.

“We have made a simple electric motor which uses a 1.5-volt torch battery. If you have the battery at home, the electric motor costs just rupees five to make. You will need a metre of insulated copper wire, two safety pins and an ordinary magnet. Imagine the gleam in the child’s eye when she is able to make the motor run. Faraday’s laws of induction will not remain mere words, but will be deeply internalised,” adds Gupta. “We have a slogan – The best thing a child can do with a toy is to break it. A good toy should welcome the child to pull it apart – separate all its pieces and put it back again.

Then the child will truly understand how it works and the halo and mystique surrounding it will disappear,” he explains. He has meticulously added videos of his experiments to his website arvindguptatoys.com, with the help of his team at Inter-University Centre for Astronomy & Astrophysics in Pune (where he recently retired from).

“We have a total of 1100 videos in English. These videos are short – less than two minutes’ duration. They have also been dubbed into 20 languages including Spanish and Chinese. Six months back, the director of The State Council Educational Research and Training (SCERT), Tamil Nadu, got 450 of our videos dubbed in Tamil by school teachers. Today, these videos in Tamil are on their YouTube channel helping tens of thousands of children across TN,” he adds.

He is now in Chennai taking care of his one-month-old grandchild born to his daughter Dr Dulari Gupta, who is doing pursuing her Doctorate in Medicine (Neurology) at the Madras Medical College. He will also be visiting schools here demonstrating easy ways to learn science. However, it is not just teaching that he’s been into.

“I was very closely associated with the National Book Trust for 15 years. In the last 25 years, I have translated over 230 books into Hindi. This is my humble attempt to make available world class literature to Hindi speaking children. While growing up in a small town, the only books we could buy were low-cost, high quality Soviet books in Hindi by Gorky, Chekov, Nosov, Leo Tolstoy and others.

I owe my love for science to the great Russian science populariser Yakub Perelman. In 1990, after the breakup of Soviet Union, publishers like Mir, Raduga and Malyshev have simply been wiped out. So, two years back I collected over 400 Soviet children’s books in Hindi, Marathi and English – scanned them and uploaded the PDFs on archive.org for posterity.

These amazing Russian children’s books were translated into almost all major Indian languages. I urge people to scan these books in Tamil too,” asserts Gupta. His work has also been recognised with several awards including the 50 Most Talented Social Innovators Award, World CSR Day, and The Indira Gandhi Award for Science Popularization.

Having worked with so many students over the years, Gupta has observed the Indian education system from close quarters. “After independence, Nehru did many good things – big industries, dams, IITs, but there was no focus on primary education.

Under the RTE, teachers take the TET (Teacher Eligibility Test) conducted by the state government. In Maharashtra, out of 100 teachers appearing for the TET only 2 per cent pass! This reflects the poor quality of teacher training. Also, in India a teacher’s social status is much worse than a government peon, unlike in countries like Finland where teachers are respected as much as civil servants. We must inspire some of our best people to get into education – and not in third rate engineering, management or business schools.”

For the nonce though, he says, “There is very little done for children – because they are not a vote bank for politicians. We need to translate world class children’s literature and make it free for children by digitising it. Buying war planes, tanks and bombs — they only make the middlemen and contractors rich. Spending more on education and health will truly secure the country.”

